



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of:

SUZUKI, Junichiro et al.

Group Art Unit: 1711

Serial No.: 10/054,983

Examiner: Travis B Ribar

Filed: January 25, 2002

P.T.O. Confirmation No.: 7623

For: POLYAMIDE-VIBRATION INSULATING RUBBER COMPOSITE BODY

REQUEST FOR RECONSIDERATION

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Date: November 7, 2003

Sir:

Reconsideration of the rejection contained in the Office Action dated August 7, 2003, in the above-identified application in view of the following detailed comments is respectfully requested.

In the Office Action, claims 1-4 were rejected under 35 USC § 103(a) as being unpatentable over the patent to Duraiaj et al in view of the patent to Jadamus et al. In making this rejection, it was asserted that the cited Duraiaj et al patent teaches the rubber composition which forms a part of the composite body as claimed except for the peroxide vulcanizing agent. Further, it was acknowledged that the Duraiaj et al patent does not disclose a composite body formed of the rubber composition and a polyamide part. The Jadamus et al patent was then asserted to teach the use of peroxide vulcanizing agents

for rubber compositions and to adhere a vulcanizable compound to a substrate. It was also asserted that the specific characteristic of the body as a vibration insulator as claimed was inherent in the composition according to the cited patents. Reconsideration of this rejection in view of the following comments is respectfully requested.

Before discussing the rejection in detail, a brief review of the presently claimed invention may be quite instructive. The invention, as recited in the subject claims, relates to a polyamide-vibration insulating rubber composite body which comprises:

a polyamide part; and

a rubber part comprising a rubber composition, said rubber part combined with the polyamide part by vulcanizing said rubber composition onto the polyamide part, the rubber composition comprising:

(A) a vibration insulating rubber comprising at least one of an ethylene-propylene-diene terpolymer and an ethylene-propylene copolymer;

(B) a peroxide vulcanizing agent;

(C) a resorcinol compound; and

(D) a melamine resin.

A important feature of the claimed composite body is that a specific adhesive component of (C) a resorcinol compound and (D) a melamine resin is mixed with (A) a vibration insulating rubber comprising at least one of an ethylene-propylene-diene

terpolymer (EPDM) and an ethylene-propylene copolymer (EPM) and the resulting rubber containing mixture is vulcanized onto the polyamide part with the use of (D) a peroxide vulcanizing agent. The polyamide-vibration insulation rubber composite body obtained has the characteristic feature that the polyamide part and the vibration insulating rubber part are firmly adhered to each other.

While the reason the rubber part prepared from the specific rubber composition has excellent adhesion properties with respect to the polyamide is not entirely clear, it is supposed that the resorcinol compound mainly serves as an auxiliary adhesive agent. It is further supposed that the melamine resin donates CH_2O to the resorcinol compound, and the CH_2O forms a covalent bond with an acid amide group ($-\text{COHN}-$) of the polyamide thereby improving the adhesive properties. For example, it may be that CH_2O is donated to resorcinol represented by the formula (C) shown in the present specification from the melamine resin to provide a compound as represented by the formula (C') shown in the present specification, which in turn forms a covalent bond with an acid amide group ($-\text{COHN}-$) of the polyamide thereby ensuring firm adhesion to the polyamide. In addition, it is supposed that the hydroxyl groups of resorcinol are partly hydrogen-bonded with acid amide groups of the polyamide, and these hydrogen bonds also contribute to the improvement of the adhesion property. It is submitted that the cited patents to Duraiaj et al and Jadamus et al, whether taken singly or in combination, do not teach or suggest the presently claimed polyamide-vibration insulating rubber composite body nor the

advantages or features thereof as discussed above.

More particularly, the Duraiaj et al patent discloses a composition containing a resorcinol compound and a melamine resin, but the patent does not disclose that the composition includes a peroxide vulcanizing agent. It is specifically noted that the Durairaj et al patent only discloses the combination of natural rubber and sulfur in Example 33 of Table 7.

Furthermore, the Durairaj et al patent only discloses a method for bonding natural rubber to metal wire. There is no teaching or suggestion in the patent regarding forming a composite body comprising a rubber part and a polyamide part by combining one with the other.

In distinct contrast, the presently claimed invention has the characteristic feature that a specific adhesive component of (C) a resorcinol compound and (D) a melamine resin is mixed with (A) a vibration insulating rubber comprising at least one of an ethylene-propylene-diene terpolymer (EPDM) and an ethylene-propylene copolymer (EPM) and the resulting mixture is vulcanized onto a polyamide part with the use of (B) a peroxide vulcanizing agent. By the characteristic feature and the resultant effects as detailed above, the polyamide-vibration insulating rubber composite body according to the present invention is obtained where the polyamide part and the vibration insulating rubber part are

firmly adhered to each other.

It is further submitted that the above-noted teaching deficiencies of the Durairaj et al patent are not supplied by the Jadamus et al patent. The latter patent discloses a process of producing a composite article of a polyamide composition bound to a vulcanized rubber compound, the process including vulcanizing a rubber compound comprising a rubber, a specific silane containing double bonds and a peroxide vulcanizing agent. In the disclosed process an EP(D)M rubber is used as the rubber.

It is to be specifically noted that the silane containing double bonds is an essential component in the Jadamus et al patent. Further, the Jadamus et al patent teaches that, in order to create a bond between the polyamide composition and the vulcanized rubber compound, the combination of the silane containing double bonds and the peroxide vulcanizing agent is used.

However, the use of a combination of the silane containing double bonds and a peroxide vulcanizing agent results in the adhesive strength with the polyamide composition being insufficient. Therefore, it is difficult to use the composite article as a heat-resistant rubber vibration insulator for mounting of an engine.

This difficulty is specifically addressed in the present specification in the discussion

regarding the problems associated with Japanese Unexamined Patent Publication No. 7-11013. In this regard, it is to be noted that the Japanese patent application corresponding to the Japanese patent publication No. 7-11013 was filed claiming priority of German patent application No. 43192142.8 filed on June 9, 1993. Therefore, it appears that the contents of the patent publication No. 7-11013 are approximately same as those of the Jadamus et al patent since it also claims priority from German patent application No. 43192142.8 filed on June 9, 1993.

In distinct contrast, the composite body as presently claimed has, as set forth above, the characteristic feature that a specific adhesive component including (C) a resorcinol compound and (D) a melamine resin is mixed with (A) a vibration insulating rubber comprising at least one of an ethylene-propylene-diene terpolymer (EPDM) and an ethylene-propylene copolymer (EPM) and the resulting mixture is vulcanized onto the polyamide part with the use of (B) a peroxide vulcanizing agent. With this characteristic feature according to the present invention, a polyamide-vibration insulating rubber composite body is obtained wherein a polyamide part and a vibration insulating rubber part are firmly adhered to each other.

There is no teaching or suggestion in the Jadamus et al patent about the characteristic feature of the presently claimed invention and further no teaching or suggestion regarding the specific advantageous effects which are obtained in accordance

with the present invention. Rather, an important feature of the Jadamus et al patent is, as stated above, the use of the combination of the silane containing double bonds and the peroxide vulcanizing agent. Therefore, it is submitted that it would not be apparent to one of ordinary skill in the art to ignore the specific teaching of the use of the silane and only use a peroxide vulcanizing agent as taught by the Jadamus et al patent by somehow separating the peroxide vulcanizing agent from the silane containing double bonds.

In summary, it is to be emphasized that a feature of the Durairaj et al patent is the combination use of a resorcinol compound, a melamine resin and a sulfur vulcanizing agent. Therefore, it is submitted that it would not be obvious to use the peroxide vulcanizing agent of the Jadamus et al patent instead of the sulfur vulcanizing agent of the Durairaj et al patent by separating the peroxide vulcanizing agent from the silane containing double bonds as specifically taught by the Jadamus et al patent.

For the reasons stated above, withdrawal of the rejection under 35 U.S.C. § 103(a) and allowance of claims 1 through 4 over the cited patents are respectfully requested.

In view of the foregoing, it is submitted that the subject application is now in condition for allowance and early notice to that effect is earnestly solicited.

Serial No. 10/054,983
OA dated 8/7/03
Req. dated 11/7/03

In the event this paper is not timely filed, the undersigned hereby petitions for an appropriate extension of time. The fee for this extension may be charged to Deposit Account No. 01-2340, along with any other additional fees which may be required with respect to this paper.

Respectfully submitted,

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